18

Tertiary Cheilostomatous Bryozoa from Victoria

A Revised Stratigraphical Distribution

By A. E. Cockbain*

Abstract: Recent work on the geology of Southwest Victoria (Kenley and others, 1964, 1967) shows that the cheilostomatous bryozoans described by Brown (1958) came from beds now assigned to Carter's (1964) faunal units 4 and 5 (Janjukian) and 6 and 7 (Longfordian). A revised stratigraphical distribution table for Brown's species is presented and the new names Koonalunda Lens and Wilkin Beds applied to two members of the Gambier Limestone.

INTRODUCTION

Cheilostomatous Bryozoa have been deseribed from Tertiary rocks in Victoria by several workers in the past hundred years. Most of this work has been systematie and few attempts have been made to summarize the stratigraphical distribution of cheilostomes. Etheridge's (1878) 'Synopsis' and Maplestone's (1904) more complete 'Tabulated List' both lack adequate stratigraphieal control. Crespin's (1943) faunal distribution tables, whilst more exhaustive, give the fossil ranges in terms of stages rather than formations; since many of these stages now have different limits it is not easy to update these tables.

In 1958, Brown published a systematic aeeount of the fossil eheilostomatous Bryozoa from southwest Vietoria and tried to use the faunas to date the rocks. He reeognized five faunas—Glenaulin Fauna, Wataepoolan Fauna, Sandford Limestone Fauna, Sample 18 Fauna and Myaring Fauna. On the basis of a quantitative comparison, he stated (Brown, 1958, p. 29): '. . . it appears that the Myaring faunas fall into a eategory distinet from that of the remaining four groups eonsidered and, in my opinion, the polyzoan faunas of these latter are very elosely related and indieate a relatively small age differenee between them'.

Brown's stratigraphical conclusions were summarized as follows (p. 7): 'The faunules of the Glenaulin Clay and Wataepoolan Limestone are closely related and probably are slightly older than the Sandford Limestone of Janjukian age. The faunules of the Myaring Beds appear to be younger and are probably of Balcombian Age'. Brown gave detailed lists of the bryozoans oecurring in each sample and formation, and hence it is possible to revise the stratigraphieal ranges of his species following recent increases in our knowledge of the geology of southwest Victoria. This paper presents sueh revised ranges and amply substantiates Brown's opinion (p. 7) . . . 'There is good evidenee that the Polyzoa are of eonsiderable value for stratigraphieal eorrelation'.

STRATIGRAPHY

Reeent geological mapping (Kenley and others, 1964, 1967) and palaeontologieal examination (Taylor, 1964) of the Tertiary roeks in southwest Vietoria by the Geological Survey of Victoria have resulted in certain ehanges in the stratigraphical interpretation of the strata from which Brown's samples were obtained and have provided independent datings and correlations of the formations by means of foraminifers. The samples numbers and formations given by Brown (1958) are summarized in Table 1 and the eurrently adopted stratigraphie framework is given

Table 1

Rock Units	Sample Numbers
Glenaulin Clay	1, 2, 16, 17, 25
Wataepoolan Limestone	(3), 4, ?15, ?18, 26, (27)
Sandford Limestone	5, 6, 22, 23, 24
Myaring Beds	7, 8, 9, 10, 11, 12, 13, 14, ?19, ?20, ?21.

Sample numbers in brackets represent samples which yielded no bryozoans. (Modified from Brown, 1958.)

* Geological Survey of Western Australia, Mineral House, Perth, W.A. 6000.
Present Address: c/- Wm. Johnson & Assoc. Pty. Ltd., 196 Adelaide Terrace, Perth, W.A. 6000.

in Table 2. All the stratigraphical units are subdivisions of the Gambier Limestone. The current views are:

1. Brown's Glenaulin Clay samples all came from the Glenaulin Clay Member which foraminifers suggest (Taylor 1964, unpublished) is Faunal Unit 4 in age (all ages are given in terms of the foraminiferal Faunal Units of Carter, 1964).

2. The Wataepoolan Limestone 'marl' samples (3, 4 and 26; see Brown, 1958, Fig. 2, section A) came from a marl lens between the top of the Glenaulin Clay Member and the Wataepoolan Limestone Member and here called the Koonalunda Lens. Foraminiferal evidence suggests that the Koonalunda Lens is low in Faunal Unit 5.

3. The only sample from the Wataepoolan Limestone Member is Sample 27 which contains no identifiable bryozoans. On the basis of foraminifers the Member is Faunal Unit 8 in age.

4. Brown's Myaring Beds samples are now considered to come from two stratigraphical units. Samples 9, 10, 11, 12, 13 and 14 were collected from the Myaring Beds as now restricted, that is the Upper Member of the Gambier Limestone in the Glenelg Valley, and Samples 7, 8, 19, 20 and 21, together with Sample 18 (regarded as ?Wataepoolan Limestone by Brown, 1958) came from the Lower Member of the Gambier Limestone, here named the Wilkin Beds. Foraminifers indicate that the Wilkin Beds are Faunal Unit 5 in age and the Myaring Beds (s.s.) span Faunal Units 6 and 7.

5. The samples from the Sandford Limestone are unchanged, although only two (22 and 23) can be reliably dated and on foraminiferal evidence (Taylor, loc. cit.) are Faunal Unit 6 in age.

6. It is still uncertain from which formation Sample 15 came; Dr. C. Abele, on the basis of foraminifers, considers it to be Faunal Unit 5 (possibly 4) in age.

REVISED DISTRIBUTION OF CHEILOSTOMATA

With the new stratigraphical information summarized above, it is possible to re-draw Brown's (1958) Distribution Table to show the formations in which the various bryozoans occur and the age range of the species in terms of Carter's Faunal Units. Such a table has been constructed (Table 3) using only those samples that can be con-

TABLE 2

Rock-stratigraphic Unit	Sample	Victorian Tertiary Stage	Carter's (1964) Faunal Unit
Glenaulin Clay Member	25, 16, 17 1, 2.	Janjukian	4
Koonalunda Lens	26, (3), 4.	Janjukian	5
Wilkin Beds - Dartmoor area	21, 18, 19, 20.	Janjukian	5
Myaring area	7, 8.	Janjukian	5
Myaring Beds	9, 10, 11,	Longfordian	6
	12, 14, 13.	Longfordian	7
Sandford Limestone - Red Cap Creek area	22, 23.	Longfordian	6
Sandford area	-	-	-
Wataepoolan Limstone Member	(27)	Longfordian	8

Note: Sample numbers are listed in ascending stratigraphical order; numbers in brackets represent samples which yielded no bryozoans. Samples 24 (Sandford Limestone, Red Cap Creek area), 5 & 6 (Sandford Limestone, Sandford area) and 15 (uncertain origin) have been omitted from table, since they cannot be reliably dated.

TABLE 3

REVISED DISTRIBUTION OF CHEILOSTOMATA FROM SOUTH-WEST VICTORIA

Formations: G = Glenaulin Clay Members; K = Koonalunda Lens; W = Wilkin Beds; S = Sandford Limestone Members; M = Myaring Beds

Faunal Units of Carter 1964: 4 and 5 = Janjukian; 6 and 7 = Longfordian

Nos.≠		G	K	W	S	M.	4	5	6	7
24	Odontionella bullata Brown	*					*			
32	Chaperia? sp. nov. Brown	*					*			
33	Onychocella sp.	*					*			
45	Lunulites parvicella (Woods)	*					*			
64	Cellaria grandis Maplestone	*					*			
71	Cellaria stachi Brown	*					*			
78	Menipea biaviculata Maplestone	*					*			
87	Figularia kenleyi Brown	*					*			
103	Gigantopora sp.	*					*			
137	Bulbipora areolata MacGillivray	*					*			
145	Escharoides erecta Canu & Bassler	*					*			
147	Bathosella bulbosa Canu & Bassler	*					*			
160	Smittina cribraria (MacGillivray)	*					*			
166	Smittina sp.	*					*			
187	Adeonellopsis glenaulinensis Brown	*					*			
201	'Cellepora' sp. 1	*					*			
7	'Membranipora' longipes Maplestone	*	*				*	*		
10	'Membranipora' crespinae Brown	*	*				*	*		
56	Crateropora inconspicua Brown	*	*				*	*		
67	Cellaria dennanti MacGillivray	*	*				*	*		
100	Bimicroporella watersi Brown	*	*				*	*		
106	Arthropoma torquis Brown	*	*				*	*		
121	'Schizoporella' parvisinuata Brown	*	*				*	*		
130	Hippoporina incomposita Brown	*	*				*	*		
138	Myriapora operculata (Canu & Bassler)	*	*				*	*		
156	Palmicellaria otwayensis (Maplestone)	*	*				*	*		
18	Glenelgia crawfordensis Brown	*	*	*			*	*		
52	Aspidostoma airense Maplestone	*	*	*			*	*		
54	Crateropora patula (Waters)	*	*	*			*	*		
89	Cribrilaria radiata (Moll)	*	*	*			*	*		
101	Gigantopora tuberculosa (Maplestone)	*	*	*			*	*		
146	Escharoides osburni Brown	*	*	*			*	*		
169	Escharella elongata (Canu & Bassler)	*	*	*			*	*		
176	'Retepora' tridentata Brown	*	*	*			*	*		
68	Cellaria cucullata MacGillivray	*		*			*	*		
2	Biflustra regularis (Maplestone)	*	*	*	*		*	*		
6	'Vincularia' gigantea Canu & Bassler	*	*	*	*		*	*		
22	Foveolaria thomasi Brown	*	*	*	*		*	*		
155	Palmicellaria quadrifrons Maplestone	*	*	*	*		*	*		
157	Palmicellaria ornata Brown	*	*	*	*		*	*		

≠ Brown, 1958.

Note: No 201 (line 16). For 'Cellepora' sp. 1 read 'Cellepora' sp. 1.

Table 3 - continued

Nos.≠		G	K	W	S	M	4	5	6	7
202	Lekythopora hystrix MacGillivray	?		?			?	?		
98	Porina gracilis var. tubulifera (MacGillivray)	*	*	*	*		*	*	*	
105	Chiastosella conservata (Waters)	*	*	*	*		*	*	*	
132	Trigonopora vermicularis Maplestone	*	*	*	*		*	*	*	
144	Escharoides duplicata (Waters)	*	*	*	*		*	*	*	
84	Cribrilina hebetata (Waters)	*	*		*		*	*	*	
91	Corbulipora ornata MacGillivray	*	*		*		*	*	*	
114	'Schizoporella' orbiculifera Canu & Bassler	*	*		*		*	*	*	
36	Ogiva concamerata Waters	*	*	*	*	?	*	*	*	
93	Corbulipora cornuta (MacGillivray)	*				*	*		*	
183	Adeonellopsis sulcata (Milne Edwards)	*				*	*		*	
153	Porella otwayensis Maplestone	*			*		*		*	
15	Ellisina profunda (MacGillivray)	*		*		?	*	*	?	
111	Tetraplaria australis Woods var.	*	*	*	?		*	*	?	
1	Tretosina arcifera Canu * Bassler	?		*		*	?	*	*	
83	Arachnopusia unicornis (Hutton)	?				*	?		*	
73	Melicerita angustiloba Woods	*		*		*	*	*	*	*
136	Cucullipora tetrasticha MacGillivray	*		*		*	*	*	*	*
148	Petraliella biincisa (Waters)	*		*		*	*	*	*	*
21	Foveolaria curdiensis Brown	*		*	*	*	*	*	*	*
74	Acerinucleus incudiferus (Maplestone)	*		*	*	*	*	*	*	*
51	Selenaria cupola var. spiralis (Chapman)	*	*	*		*	*	*	*	*
59	Cellaria bicornis (Busk)	*	*	*		*	*	*	*	*
25	Ramphonotus lusorius (Waters)	*	*	*	*	*	*	*	*	*
60	Cellaria contigua MacGillivray	*	*	*	*	*	*	*	*	*
79	Arachnopusia liversidgei (Woods)	*	*	*	*	*	*	*	*	*
97	Porina gracilis var. vertebralis (Stoliczka)	*	*	*	*	*	*	*	*	*
99	Didymosella larvalis (MacGillivray)	*	*	*	*	*	*	*	*	*
126	Hippoporina burlingtoniensis (Waters)	*	*	*	*	*	*	*	*	*
167	Smittinella tatei (Woods)	*	*	*	*	*	*	*	*	*
184	Adeonellopsis yarraensis (Waters)	*	*	*	*	*	*	*	*	*
186	Adeonellopsis symmetrica (Waters)	*	?	*		*	*	*	*	*
66	Cellaria rigida var. perampla (Waters)	*	*		?	*	*	*	?	*
35	Aechmella ambigua (MacGillivray)	*		?		*	*	?	*	*
20	Crassimarginatella sculpta (MacGillivray)	*		*		*	*	*		*
172	Tubitrabecularia elevata (Woods)	*		*		*	*	*		*
159	Smittina ordinata (MacGillivray)	*	*		*	*	*	*		*
58	Cellaria australis (MacGillivray)	*	*	*	*	?	*	*		?
5	'Amphiblestrum' planulatum Maplestone		*					*		
8	'Membranipora' ancarteri Brown		*					*		

≠ Brown, 1958.

Note: No. 1 (line 15). For Canu* Bassler read Canu & Bassler.

Table 3 - continued

Nos.≠		G	K	W	S	M	4	5	6	7
9	'Membranipora' ancarteri Brown		*					*		
11	'Membranipora' striata MacGillivray		*					*		
16	Ellisina aff. incrustans (Waters)		*					*		
39	Micropora elegans Maplestone		*					*		
42	Macropora cribrilifera Maplestone		*					*		
70	Cellaria mitrata Brown		*					*		
77	Menipea retroversa Maplestone		*					*		
86	Reginella maplestonei Brown		*					*		
88	Figularia sp.		*					*		
118	'Schizoporella' aff. tenuilamellosa Canu & Bassler		*					*		
124	Microporella ciliata (Pallas) var.		*					*		
129	Hippoporina aff. bairnsdalei (Waters)		*					*		
143	Plagiosmittia australis Brown		*					*		
164	Smittina rogickae Brown		*					*		
165	Smittina aff. lateralis (MacGillivray)		*					*		
168	Smittinella wataepoolanensis Brown		*					*		
189	Anarthropora voigti Brown		*					*		
191	Vittaticella grandis (Maplestone)		*					*		
14	Ellisina gregsoni (MacGillivray)		*	*				*		
19	Callopora monilifera (Maplestone)		*	*				*		
65	Cellaria biaperta Maplestone		*	*				*		
119	'Schizoporella' baini Brown		*	*				*		
131	Hippomenella magna Canu & Bassler		*	*				*		
154	Porella rogeri Brown		*	*				*		
162	Smittina uttleyi Brown		*	*				*		
177	'Retepora' dartmoorensis Brown		*	*				*		
200	Holoporella tridenticulata (Busk)		*		*			*		
28	Hiantopora aff. radicifera (Hincks)			*				*		
46	Lanulites adunca Brown			*				*		
108	Gemellipora auriculata Maplestone			*				*		
133	Trigonopora personata (Maplestone)			*				*		
135	Emballotheca angustata Canu & Bassler			*				*		
152	Porella rhomboidalis Maplestone			*				*		
170	Marguetta? geminata Brown			*				*		
194	Stenostomaria solida (Waters)			*				*		
196	Catenicella tenuis MacGillivray			*				*		
197	Catenicella cf. cribriformis Waters			*				*		
142	'Lepralia' sp.			*				*		
163	Smittina inarmata Brown			*	*			*		
3	Biflustra delta Brown	*			*			*	*	

≠ Brown, 1958.

Note: No. 9 (line 1). For 'Membranipora' ancerteri Brown read 'Membranipora' pegma Brown.
No. 46 (line 29). For Lanulites adunca Brown read Lunulites adunca Brown.

Table 3 - continued

Nos.≠		G	K	W	S	M	4	5	6	7
161	Smittina eagari Brown		*		*			*	*	
13	Hincksina geminata (Waters)		*	*	*			*	*	
149	Discopora vultur (Hincks)		*	*	*	*		*	*	
81	Arachnopusia terminata (Waters)		*		?	*		*	*	
55	Crateropora ordinata (Waters)			*	*			*	*	
43	Lunulites rutella Woods			*		*		*	*	
72	Cellaria veteripontis Brown			*		*		*	*	
181	'Retepora' sp. 3			*		*		*	*	
182	Adeona? armata (Waters)			*		*		*	*	
188	Bracebridgia emendata (Waters)			*		*		*	*	
96	Porina gracilis (Lamarck)			*	*	*		*	*	
17	Caleschara denticulata (MacGillivray)			*		*		*	*	*
34	Aechmella depressa (MacGillivray)			*		*		*	*	*
69	Cellaria myaringensis Brown			*		*		*	*	*
116	'Schizoporella' submersa Waters			*		*		*	*	*
185	Adeonellopsis obliqua (MacGillivray)			*		*		*	*	*
30	Chaperia cylindriformis (Waters)			*	*	*		*	*	*
38	Steganoporella haddoni Harmer		*			*		*		*
192	Vittaticella aff. insignis (MacGillivray)		*			*		*		*
120	'Schizoporella' suffugium Brown			*		*		*		*
140	'Lepralia' rotunda (Waters)			*		*		*		*
104	Chiastosella daedala (MacGillivray)		?			*		?		*
75	Caberea grandis Hincks			?		*		?	*	*
94	Corbulipora pennata Brown				*				*	
113	Lacerna ovalis (Maplestone)				*				*	
122	'Schizoporella' roberti Brown				*				*	
123	'Schizoporella' sinudentata Brown				*				*	
128	Hippoporina aff. elongata (MacGillivray)				*				*	
173	Sertella mucronata (Waters)				*				*	
174	Sertella nangeelaensis Brown				*				*	
178	'Retepora' incisura Brown				*				*	
179	'Retepora' sp. 1				*				*	
180	'Retepora' sp. 2				*				*	
190	Vittaticella enormis (Maplestone)				*				*	
195	Ditaxipora internodia (Waters)				*				*	
198	Sphaeropora fossa Haswell				*				*	
4	Conopeum? sp.				*					
12	'Membranipora' sp.				*					
23	Odontionella aff. cyclops (Busk)				*					
53	Aspidostoma cavatum (Waters)				*					

≠ Brown, 1958.

Table 3 - continued

Nos.≠		G	K	W	S	M	4	5	6	7
117	'Schizoporella' filiformis Waters				?	*			*	
29	Chaperia acanthina (Lamouroux)					*			*	
40	'Micropora' carinata Maplestone					*			*	
57	Crateropora sp.					*			*	
62	Cellaria robusta Maplestone					*			*	
85	Cribrilina jonesi Brown					*			*	
102	Gigantopora cribraria (MacGillivray)					*			*	
112	Tetraplaria pedunculata (MacGillivray)					*			*	
175	'Retepora' rimata Waters				*	*			*	*
115	'Schizoporella' macgillivrayi Canu & Bassler				?	*			*	*
47	Selenaria maculata (Busk)					*			*	*
49	Selenaria grandicella Canu & Bassler					*			*	*
80	Arachnopusia liversidgei var. perforata (Waters)					*			*	*
92	Corbulipora elevata (MacGillivray)					*			*	*
109	Gemellipora polita MacGillivray					*			*	*
158	Palmicellaria microporoides Brown					*			*	*
37	Ogiva elongata (Canu & Bassler)				?	*				*
26	Nellia oculata Busk					*				*
27	Hiantopora intermedia (Kirkpatrick)					*				*
31	Chaperia aff. multifida (Busk)					*				*
41	Macropora crassatina (Waters)					*				*
44	Lunulites canaliculata MacGillivray					*				*
48	Selenaria magnipunctata Maplestone					*				*
50	Selenaria macgillivrayi var. lucens (MacGillivray)					*				*
61	Cellaria enormis Maplestone					*				*
63	Cellaria tumida Maplestone					*				*
76	Canda fossilis Waters					*				*
82	Arachnopusia terminata var. coronata (Canu & Bassler)					*				*
90	Acanthocella tubulifera (Hincks)					*				*
95	Corbulipora aff. ampulla Maplestone					*				*
107	Schizomavella cf. auriculata (Hassall)					*				*
110	Tetraplaria australis Woods					*				*
125	Hippoporina pertusa (Esper)					*				*
127	Hippoporina praetexta (Canu & Bassler)					*				*
134	Trigonopora plana Brown					*				*
139	'Lepralia' bisinuata Maplestone					*				*
141	'Lepralia' orimagna Brown					*				*
150	Discopora vultur var. aviculifera (Canu & Bassler)					*				*
151	Porella marsupium (MacGillivray)					*				*
171	Tubucellaria cereoides (Ellis & Solander)					*				*
193	Strophipora harveyi (Wyville-Thomson)					*				*
199	Conescharellina cancellata (Busk)					*				*

≠ Brown, 1958.

fidently assigned to either a particular formation or Faunal Unit (i.e. all except Sample 15).

Using the ranges of the bryozoans given in Table 3, it is possible to suggest an age for the doubtful samples 5, 6, 24 and 15 (footnote, Table 2).

Sample 15 is probably Faunal Unit 5
Sample 24 is probably Faunal Unit 5
Sample 5 is probably Faunal Unit 5
Sample 6 is either Faunal Unit 4 or 5.

Table 3 shows that the formations are Janjukian and Longfordian in age. Further work on bryozoan faunas is needed to extend the distribution table to cover pre-Janjukian and post-Longfordian strata. A start has been made on this by Cockbain (1969) who gave a list of late Eocene and early Miocene species of Cheilostomata occurring in the south of Western Australia.

QUANTITATIVE ANALYSIS OF DISTRIBUTION TABLE

Brown (1958) compared his five faunas statistically, and it is instructive to perform a similar analysis on the revised data. Several methods of comparing the degree of resemblance between two faunas have been reviewed by Simpson (1960). His preferred method is here called the Simpson faunal correlation coefficient and is calculated as follows:

$$Cs = \frac{C}{Nl}$$

where Cs is the Simpson faunal correlation coefficient ($0.0 < Cs < 1.0$), C is the number of species in common between two faunas, Nl is the fauna with the smaller number of species.

Brown's figures are given in his Table 2 where the highest figure for each pair of faunas is the Simpson faunal correlation coefficient expressed as a percentage. Calculations based on the revised data are given in Table 4A herein. From this table it will be seen that the Myaring Beds (s.s.) still have a low faunal correlation coefficient with the other stratigraphical units and this is in part a reflection of the high number (49%) of species restricted to the unit. The highest faunal correlation coefficient is between the Glenaulin Clay Member and the Koonalunda Lens ($Cs = 0{\cdot}60$) which is the same as the percentage of correspondence between the Glenaulin Fauna and the Wataepoolan Fauna of Brown (1958).

TABLE 4
SIMPSON FAUNAL CORRELATION COEFFICIENTS FOR FORMATIONS (A) AND FAUNAL UNITS (B)

4A

FORMATIONS	Glenaulin Clay Member	Koonalunda Lens	Myaring Beds	Wilkin Beds	Sandford Lime-Stone Member
Glenaulin Clay Member	75 (20%)				
Koonalunda Lens	0·60 (45)	81 (25%)			
Myaring Beds	0·31 (23)	0·20 (16)	87 (49%)		
Wilkin Beds	0·53 (40)	0·52 (30)	0·44 (34)	77 (14%)	
Sandford Limestone Member	0·48 (26)	0·52 (28)	0·28 (15)	0·50 (27)	54 (31%)

4B

FAUNAL UNITS	4	5	6	7
4	75 (20%)			
5	0·73 (55)	119 (34%)		
6	0·37 (28)	0·55 (43)	78 (28%)	
7	0·31 (21)	0·45 (30)	0·48 (32)	67 (40%)

75 = *number of species in unit;* 0·60 = *Simpson faunal correlation coefficient;*
(20%) = *percentage of species restricted to unit;* (45) = *number of species in common.*

Simpson faunal correlation coefficients may also be calculated for the four Faunal Units into which the formations are placed and this has been done in Table 4B. This table shows, as would be expected, that adjacent Faunal Units more closely resemble one another than do widely separated ones. On the other hand over half the species occur in only one Faunal Unit:

105 species (54%) occur in 1 Faunal Unit
56 species (29%) occur in 2 Faunal Units
19 species (9%) occur in 3 Faunal Units
16 species (8%) occur in 4 Faunal Units

This exclusiveness would suggest that cheilostomatous bryozoans are potentially useful biostratigraphically.

Brown's quantitative analysis of his faunas enabled him to correlate and suggest an age for the fossiliferous samples. However, a comparison of Tables 4A and B shows that faunal correlation coefficients must be treated with reserve because faunas of the same age (for example, Wilkin Beds and Koonalunda Lens with Cs of 0·52) may have a lower faunal correlation coefficient than successive Faunal Units (for example, Faunal Units 4 and 5 with Cs of 0·73).

ACKNOWLEDGMENTS

I thank Mr. P. R. Kenley of the Geological Survey of Victoria for generously providing me with the revised stratigraphical framework for the samples and suggesting the new names 'Koonalunda Lens' and 'Wilkin Beds'. He also made available to me unpublished foraminiferal datings by Mr. D. J. Taylor on some of the samples, and Dr. C. Abele's dating of sample 15. I further thank him and Professor D. A. Brown for reading the manuscript.

REFERENCES

Brown, D. A., 1958. Fossil Cheilostomatous Polyzoa from South-West Victoria. *Geol. Surv. Vict. Memoir*, 20.

Carter, A. N., 1964. Tertiary Foraminifera from Gippsland, Victoria and their stratigraphical significance. *Ibid.* Memoir 23.

Cockbain, A. E., 1969. Notes on Cheilostomatous Bryozoa from the Eucla Group, Western Australia. *Geol. Surv. West. Aust. Rec. 69/8.*

Crespin, I., 1943. The stratigraphy of the Tertiary marine rocks in Gippsland, Victoria. *Pal. Bull. 4 (Dept. of Supply and Shipping, Australia).*

Etheridge, R., Jr., 1878. A synopsis of the known species of Australian Tertiary Polyzoa. *Jour. roy. Soc. N.S.W.*, 11: 129-143.

Kenley, P. R., et al., 1964. Dartmoor 1:63,360 geological map. *Geol. Surv. Vict.*

————, 1967. Casterton 1:63,360 geological map. *Geol. Surv. Vict.*

Maplestone, C. M., 1904. Tabulated list of the fossil cheilostomatous Polyzoa in the Victorian Tertiary deposits. *Proc. Roy. Soc. Vict.* 17: 182-219.

Simpson, G. G., 1960. Notes on the measurement of faunal resemblance. *Amer. Jour. Sci.*, 258A: 300-311.

Taylor, D. J., 1964. Tertiary calcareous sediments from Dartmoor-Casterton area, South-west Victoria. *Geol. Surv. Vict. Unpubl. Rept. 1964/54*, 3 p.